

### **ABSTRACT OF THE DISCLOSURE**

Disclosed is a voice activity detector using a complex Laplacian statistic module, the voice activity detector including: a fast Fourier transformer for performing a fast Fourier transform on input speech to analyze speech signals of a time domain in a frequency domain; a noise power estimator for estimating  
5 a power of noise signals from noisy speech of the frequency domain output from the fast Fourier transformer; and a likelihood ratio test (LRT) calculator for calculating a decision rule of voice activity detection (VAD) from the estimated power of noise signals from the noise power estimator and a complex Laplacian  
10 probabilistic statistical model.